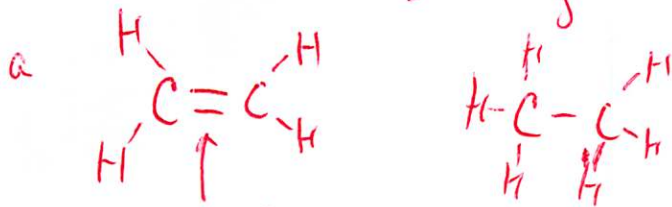


Bonding + Crystals

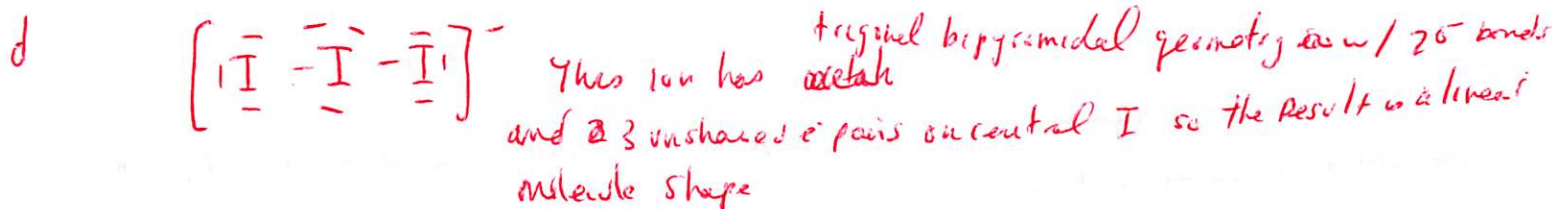
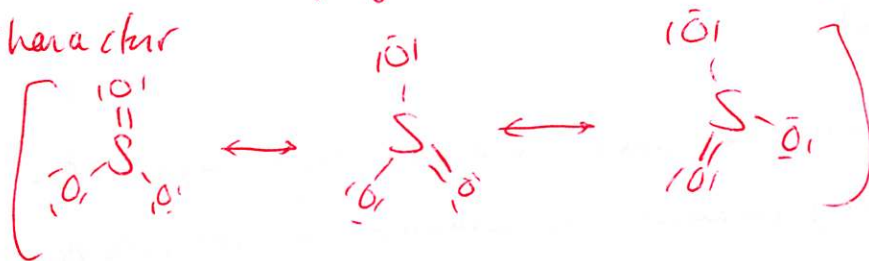
(1)



The sp^2 hybridized C's in C_2H_4 make shorter C-C σ bonds than in sp^3 hybridized C's in C_2H_6 ~~but~~



c B/c the S-O bonds are undergoing e^- delocalization (Resonance) and have partial double bond character



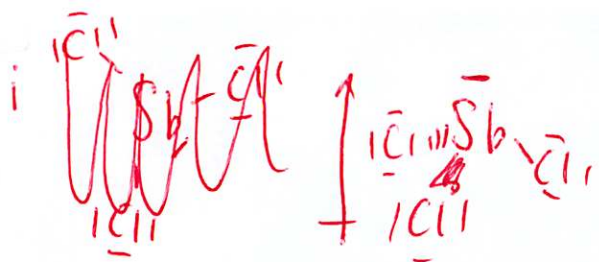
e Xe has more e^- than Ne there are it higher London Dispersion forces b/c it's instantaneous and induced dipoles are stronger which causes more attraction b/w atoms thus more E is req'd to overcome this attraction.

f Cu has empty valence e^- shell for e^- to travel but CCl_2 does not.

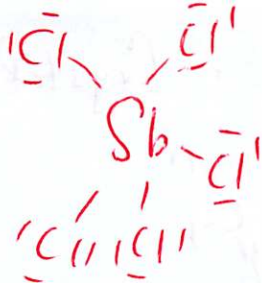
g SiO_2 is a covalent network crystal held by covalent bonds
 CO_2 is a molecular network crystal held by ~~covalent~~ Dispersion forces.

h NF_3 molecules have an unshared e^- pair on N which does not allow for symmetrical ~~cancellation of~~ bonds. BF_3 is symmetrical which cancels out bond polarities.





trigonal pyramidal
Shape w/ lone e⁻ pair
to account for dipole



trigonal bi pyramidal
w/ no lone e⁻ pairs
Polarities of Bonds cancel

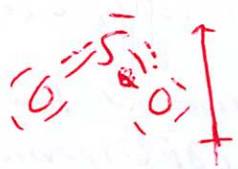
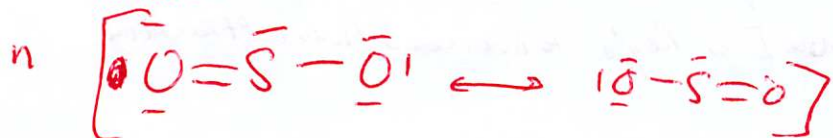
j $\text{CCl}_4 + \text{CBr}_4$ are both nonpolar ~~but~~ and exhibit dispersion forces.

CBr_4 has higher dispersion forces b/c it has more e⁻
(greater)

k NaI is held by ionic Bonds which can be disrupted by the polar H_2O molecules
 I_2 is held together by covalent bonds which are not attracted by to Polar H_2O bonds

l Ca^{2+} formation has a greater energy change b/c 2e⁻ are being removed where in K_2O , K^+ only has one e⁻ removed so it requires less energy

m K^+ has a larger 2nd IE b/c it is removing a core e⁻ which is closer to nucleus which takes more E to remove. Ca's 2nd e⁻ is an outer shell e⁻ which takes less E to remove.



Bent shape + unshared e⁻ pair
there so an unequal distribution of e⁻

CO_2 is linear and
has polarity of bonds
cancel



- 0 Co^{2+} has unpaired e^- in d-orbital which can undergo d-d transitions releasing quanta of light in visible spectrum. Zn^{2+} does not.
- 1 H-F can undergo hydrogen bonds which are stronger intermolecular forces than the dipole-dipole forces that H-Cl undergoes. Therefore HF molecules are more attracted to each other.
- 4 S has vacant d-orbitals in the 3rd E-level which can allow for expanded octets. Oxygen ^{does not have vacant d-orbitals} in the 2nd E-level so it cannot.
- 7 MgO has a higher lattice E than NaF b/c the ions in MgO have +2/-2 charge difference where LiF has a +1/-1 charge difference.
- 2 a As you go down the period ~~for~~ each metal has a lower charge density b/c the atoms get larger. This lower charge density ^{causes} ~~allows~~ the atoms to be less attracted to each other and require less E to melt.
- b As you go down the group of halogens MP \uparrow b/c the dispersion forces \uparrow . This happens b/c there are more e^- /atom down the group which causes ~~more~~ stronger induced and instantaneous dipoles not requiring more E to make them melt.
- c MP should ~~decrease~~ ^{highest} in the following order $\text{LiF} > \text{NaCl} > \text{KBr} > \text{CsI}$ ^{lowest} ~~But~~ ^{Even though} all compounds have +1/-1 ions, the size of each ion is increasing from LiF to CsI. Therefore as size \uparrow charge density of ion decreases making the attractive ionic forces decrease. So Li^+ & F^- ions are more attracted to each other b/c they are smaller ions.